FUTV4311A MPEG-2/H.264 HD Encoder

HW Version: V1.3.11

Web NMS Version: V1.28

Date: 9th JUNE, 2013

About This Manual

Intended Audience

This user manual has been written to help people who have to use, to integrate and to install the product. Some chapters require some prerequisite knowledge in electronics and especially in broadcast technologies and standards.

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Chapter 1 Introduction

1.1 Product Overview

FUTV4311A MPEG-2/H.264 HD Encoder is the new broadcasting audio & video encoding and multiplexing device with powerful functionality. It is equipped with multiple video input interfaces (SDI, CVBS, YPbPr and HDMI) and audio input interfaces (AES, RCA and XLR). It supports both MPEG-2 and MPEG-4 AVC/H.264 video encoding and MPEG1 Layer II, HE-AAC and LC-AAC audio encoding. Multiplexing function is also embedded to select the input programs and output stream through ASI/IP port in the same time.

1.2 Key Features

- **MPEG-2 HD/SD and MPEG-4 AVC/H.264 HD/SD video encoding**
- **Support 720P, 1080I, 480I and 576I video resolution**
- **MPEG1 Layer II, HE-AAC (v1&v2) and LC-AAC audio encoding**
- **Support 2 stereo or 4 Mono audio encoding**
- **Support AC3 pass through**
- **Support CC (Closed Caption), EIA 608 and EIA 708**
- **Applicable for one Seg/ISDB-T utilization (2 streams output simultaneously: 1 for one-seg and 1 for main stream)**
- **IP (MPTS/8*SPTS) Output; ASI Output**
- **GOP structure setting**
- **Support CBR & VBR control**
- **Support UDP/RTP media transmission protocols & multicast/unicast output**
- **LCD / keyboard control and web management**

1.3 Specifications

Input		1×SDI, 1×CVBS, 1×YPbPr and 1×HDMI input
		2×XLR, 2×RCA and 1×AES inputs
		1×ASI input, BNC interface
Video	Resolution	1920×1080i @59.94Hz, 1920×1080i @50Hz
		1280×720p@59.94Hz, 1280×720p @50Hz
		720×480i @59.94Hz, 720×576i @50Hz
	Encoding	MPEG-2 HD/SD; MPEG-4 AVC/H.264 HD/SD
	Bit-rate	0.25 Mbps~60.5Mbps
	Rate Control	CBR/VBR
	GOP Structure	Auto, IP, IPB, IPBB, IPBBB, IPBBBB, IPBBBBB
	Aspect Ratio	4:3; 16:9; 1:1; 2.35:1
	Advanced Pretreatment	De-interlacing, noise reduction, sharpening
Audio	Encoding	MPEG-1 Layer II, HE-AAC (v1&v2), LC-AAC
	Sampling rate	48KHz
	Resolution	24-bit
	Bit-rate	32Kbps~384Kbps
Multiplexing		1 ASI input multiplexed with 1 local channels TS
Stream output		2×ASI output ports, BNC interface
		MPTS/8*SPTS over UDP/RTP, 10/100 Base-T Ethernet interface (UDP/RTP multicast/unicast)
System function		LCD/keyboard and web management
		Language: English
		Ethernet software upgrade
General	Dimensions	482mm×405mm×44.5mm (W × D × H)
	Approx weight	4.5Kg
	Temperature range	0~45℃(Operation), -20~80℃(Storage)
	Power requirement	AC110V±10%, 50/60Hz AC 220V±10%,50/60Hz
	Power consumption	21W

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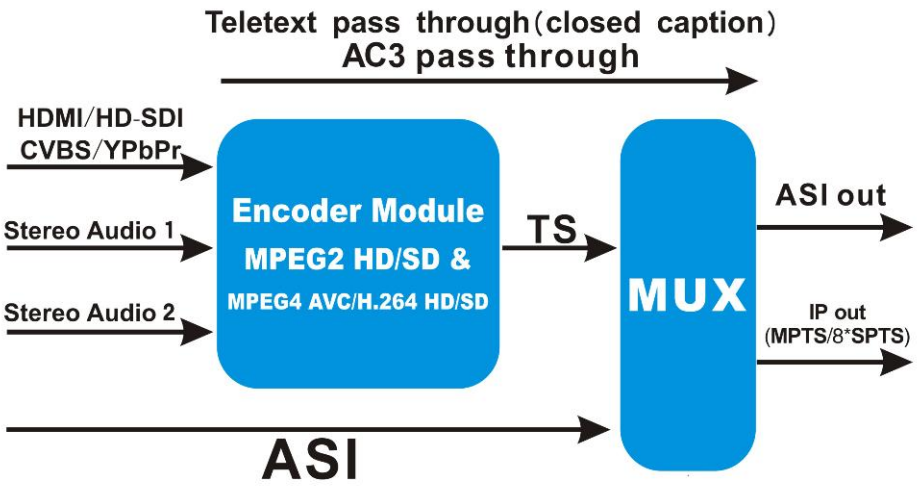
1.4 Principle Chart



1.5 Appearance and Description

Front Panel Illustration

① **LCD window**
② **Indicators**
③ **Up and down, left and right navigation buttons**
④ **Enter button: for confirm**
⑤ **Menu button: for back step**
⑥ **Lock button: press to lock set**

Rear Panel Illustration

① SDI input connector
② YPbPr & CVBS input connectors
③ AES, RCA and XLR input connectors
④ HDMI input connector
⑤ ASI input connector
⑥ NMS connector for connecting Web management on PC
⑦ DATA Port (not applicable currently)
⑧ DATA Port for IP stream output
⑨ ASI output connectors
⑩ Power supply/Fuse
Grounding

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Chapter 2 Installation Guide

This section is to explain the cautions the users must know in some case that possible injure may bring to users when it's used or installed. For this reason, please read all details here and make in mind before installing or using the product.

2.1 General Precautions

ü Must be operated and maintained free of dust or dirty.

ü The cover should be securely fastened, do not open the cover of the products when the power is on.

ü After use, securely stow away all loose cables, external antenna, and others.

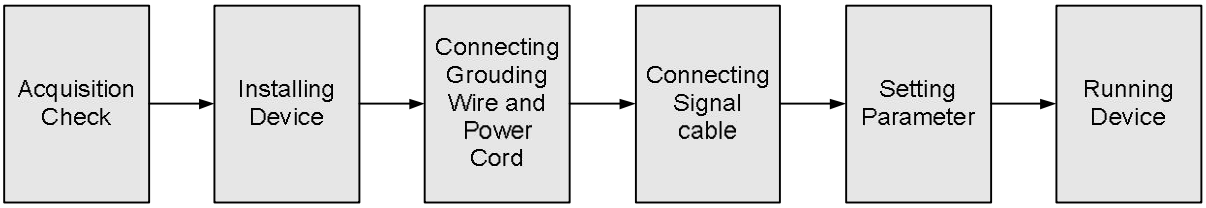
2.2 Power precautions

ü When you connect the power source, make sure if it may cause overload.

ü Avoid operating on a wet floor in the open. Make sure the extension cable is in good condition

ü Make sure the power switch is off before you start to install the device

2.3 Device's Installation Flow Chart Illustrated as following



2.4 Environment Requirement

Item	Requirement
Machine Hall Space	When user installs machine frame array in one machine hall, the distance between 2 rows of machine frames should be 1.2~1.5m and the distance against wall should be no less than 0.8m.
Machine Hall Floor	Electric Isolation, Dust Free Volume resistivity of ground anti-static material: $1X10^{7}$~$1X10^{10}\Omega$，Grounding current limiting resistance: 1MΩ (Floor bearing should be greater than 450Kg/m^2)
Environment Temperature	5~40℃(sustainable)，0~45℃(short time)， installing air-conditioning is recommended
Relative Humidity	20%~80% sustainable 10%~90% short time
Pressure	86~105KPa
Door & Window	Installing rubber strip for sealing door-gaps and dual level glasses for window
Wall	It can be covered with wallpaper, or brightness less paint.
Fire Protection	Fire alarm system and extinguisher
Power	Requiring device power, air-conditioning power and lighting power are independent to each other. Device power requires AC 110V±10%, 50/60Hz or AC 220V±10%, 50/60Hz. Please carefully check before running.

2.5 Grounding Requirement

ü All function modules' good grounding is the basis of reliability and stability of devices. Also, they are the most important guarantee of lightning arresting and interference rejection. Therefore, the system must follow this rule.

ü Grounding conductor must adopt copper conductor in order to reduce high frequency impedance, and the grounding wire must be as thick and short as possible.

- ü Users should make sure the 2 ends of grounding wire well electric conducted and be antirust.
- ü It is prohibited to use any other device as part of grounding electric circuit
- ü The area of the conduction between grounding wire and device's frame should be no less than 25 mm^2.

Chapter 3 Front Panel Operation

FUTV4311A's front panel is user operation interface where users configure the device manually. The LCD is a 2-line * 40-character back-lit dot-matrix user interface with pushbuttons for **UP, DOWN, LEFT, RIGHT, ENTER, MENU,** and **LOCK** for front panel control.

User can decide whether to directly use the factory setting, or customize the input/output parameters and etc.

Keyboard Function Description

LEFT/RIGHT: To choose and set the parameters

UP/DOWN: To modify activated parameters or page up/down when parameter is inactivated.

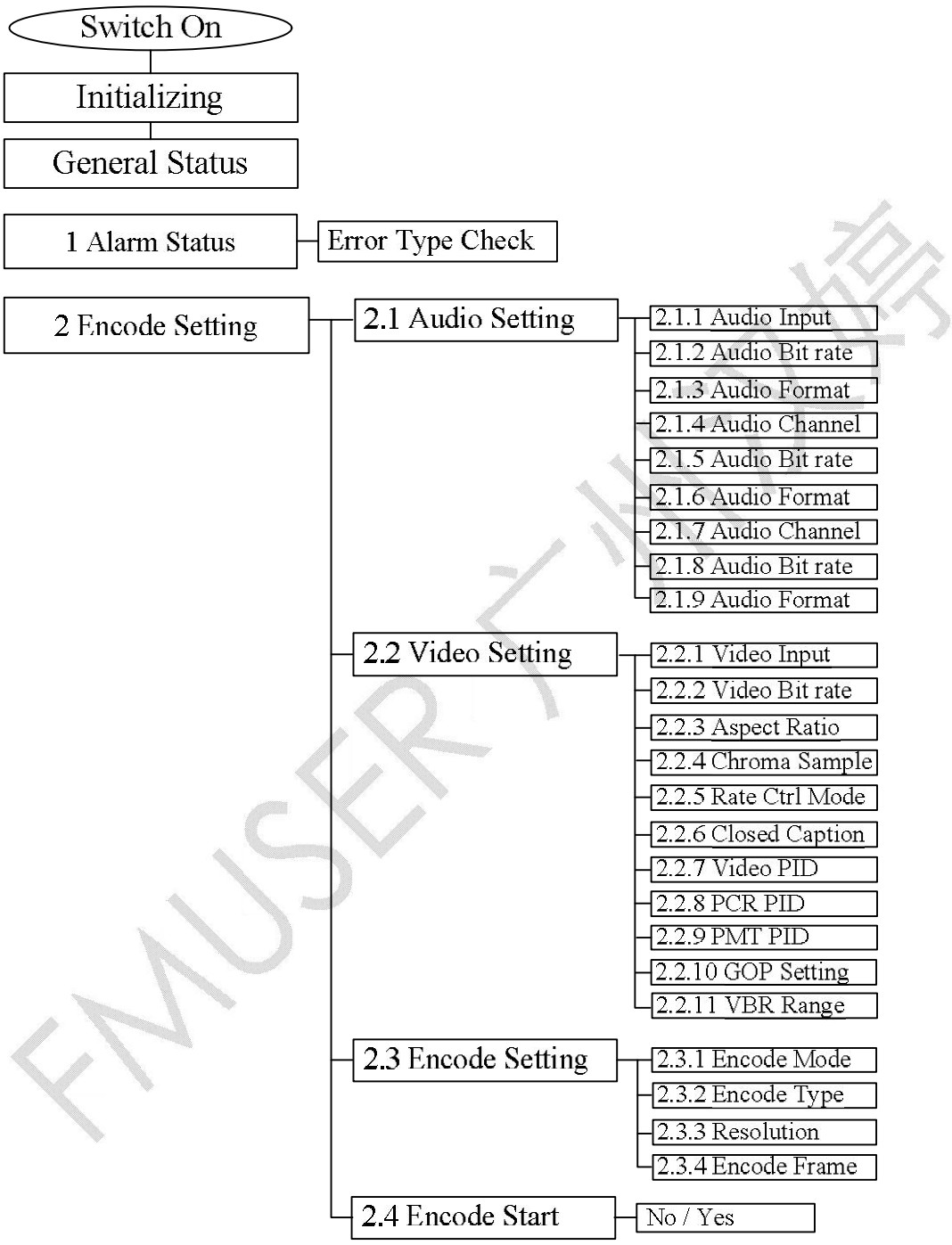
MENU: To cancel presently entered value, resume previous setting;

ENTER: To activate the parameters which need modification, and confirm the changes after modification

LOCK: Lock the screen / cancel the lock state .After pressing lock key, the system will question the users to save or not .If not, the LCD will display the current configuration state

3.1 LCD Menus

An overview of the LCD menus:



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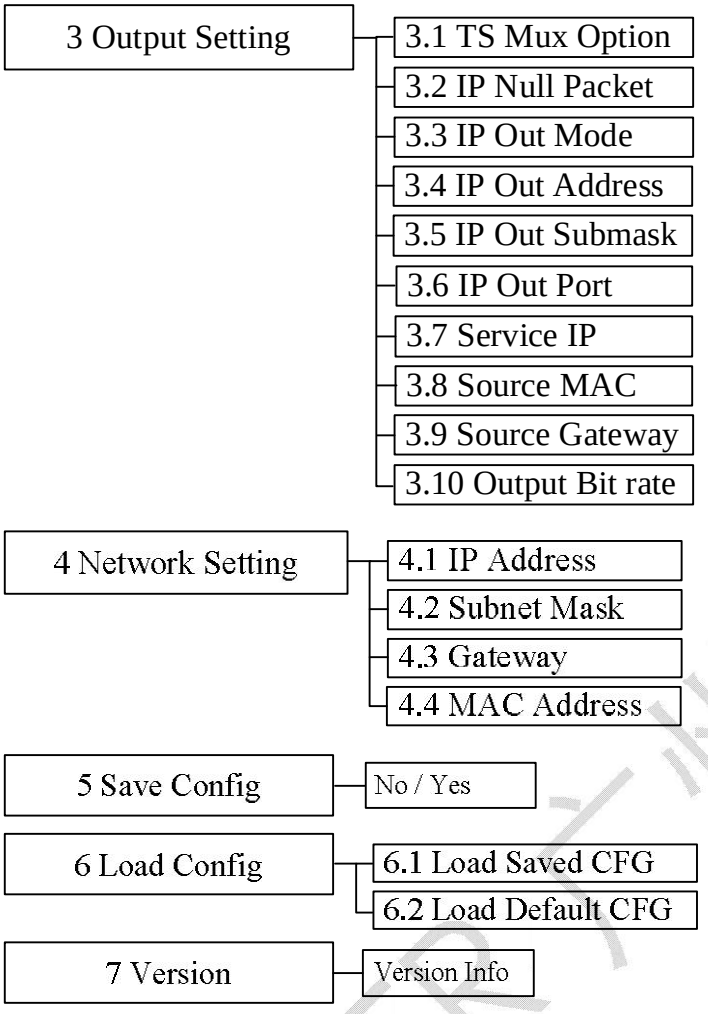
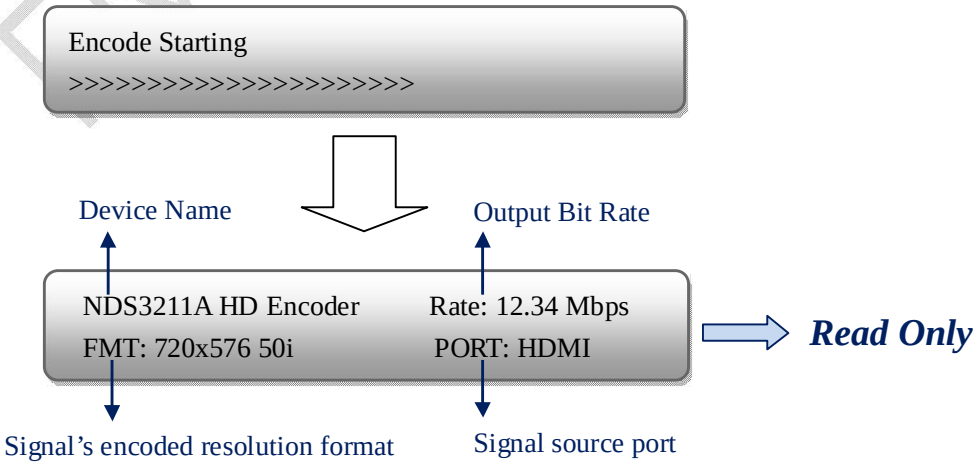


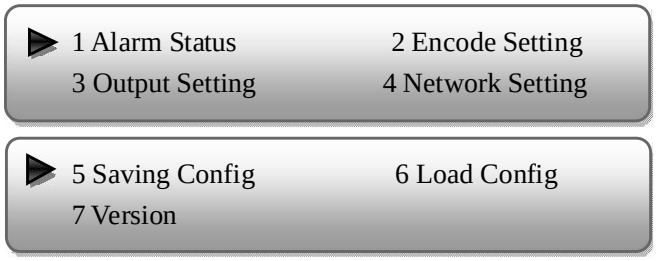
3.2 Initial Status

Switch on the device and after a few seconds' initialization, it presents booting pictures as below:



3.3 General Settings for Main Menu

Press "***LOCK***" key on the front panel to enter the main menu. The LCD will display the following pages where user can configure the parameters for the device:



User can press UP/DOWN/LEFT/RIGHT buttons to specify menu item, and then press ENTER to enter the submenus as below:

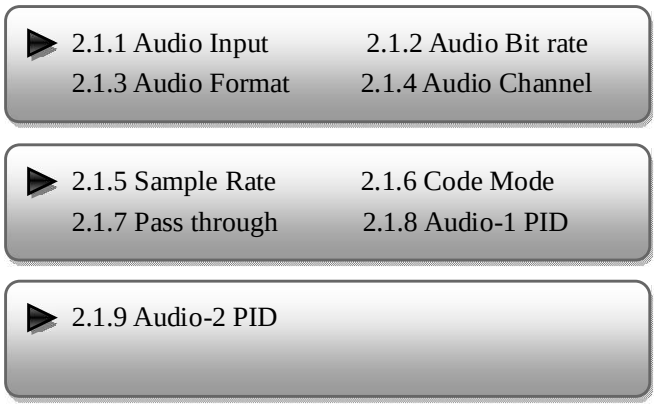
3.3.1 ALARM STATUS

The alarm indicator will turn on if signal source loses or encoding errors occur. User can then enter this menu to check the error type.

3.3.2 ENCODE SETTING

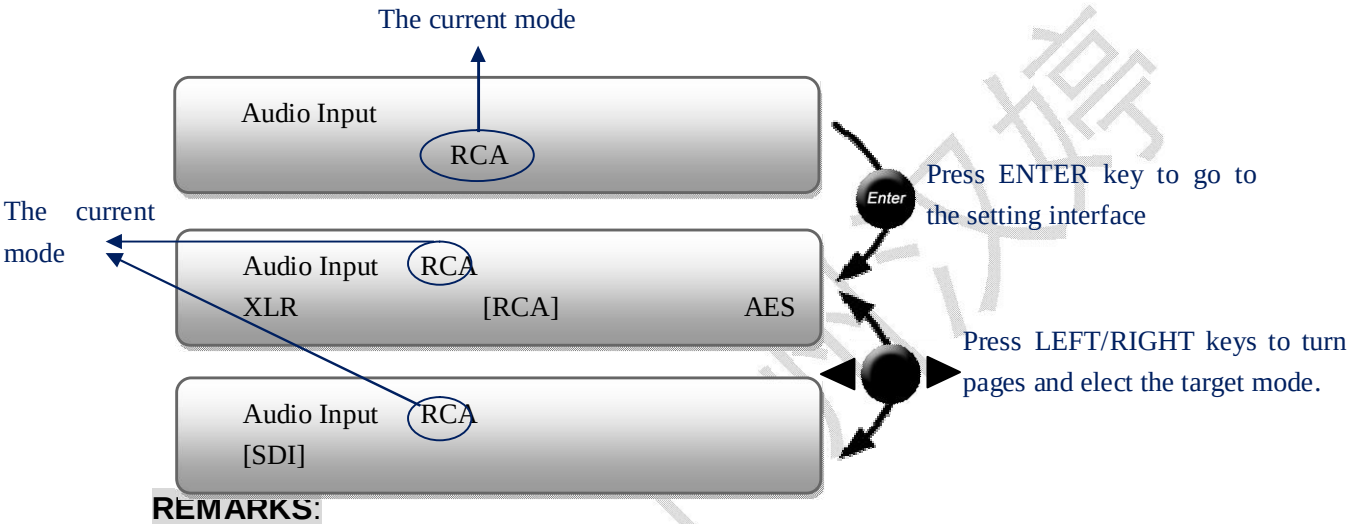
Enter "*2 Encode Setting*" to configure the Video/Audio parameters for the input program (HDMI/SDI/YPbPr/CVBS input program). Submenus go as below:

3.3.2.1 Audio Setting



Ø **Audio Input**

Press ENTER to enter menu *2.1.1Audio Input*. It displays the current mode of audio input. Press ENTER again to enter the setting interface, move the square bracket with LEFT/RIGHT keys to select the target mode and press ENTER to confirm. At last, press MENU to step back to the upper menus.



REMARKS:

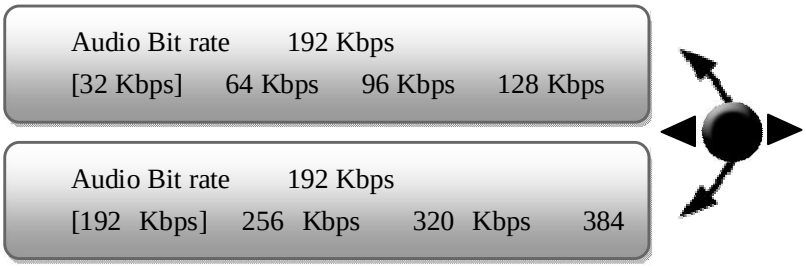
If the audio source is from **HDMI** or **SDI**, the system will automatically identify and match the interface. It is not necessary to set this menu. If the audio source is from **XLR, RCA** or **AES**, it needs to match the interface manually.

NOTE

THE OPERATIONAL APPROACHES DEFINED ABOVE ARE APPLICABLE FOR ALL THE OTHER SETTINGS.

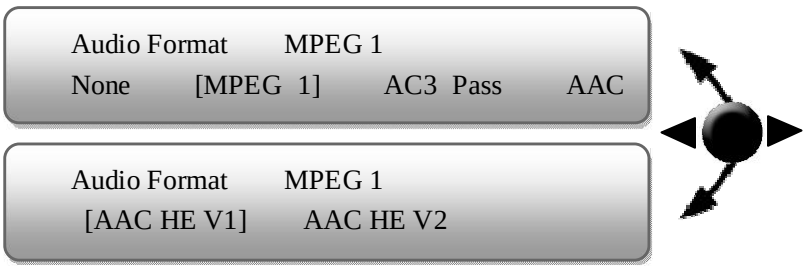
Ø **Audio Bit rate**

Select audio bit rate among 32Kbps – 384Kbps.



Ø **Audio Format**

Select audio format among items listed in the interface.



REMARKS:

- If "*None*" is chosen the audio format, the system will not choose any audio to process and there will be no audio in the output data stream.
- If "*AC3 Pass*" is chosen, user needs to enable the pass-through function at menu "*2.1.7 Pass through*"

Ø **Audio Channel**

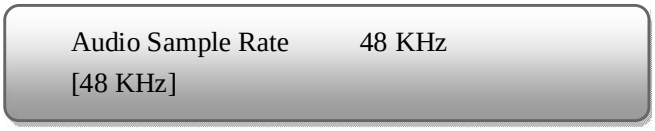
FUTV4311A HD Encoder supports both **single** audio channel and **dual** audio channels (Audio1 and Audio 2).

Single: Only Audio 1 will be effect.

Multi: Both Audio 1 and Audio 2 will be effect.

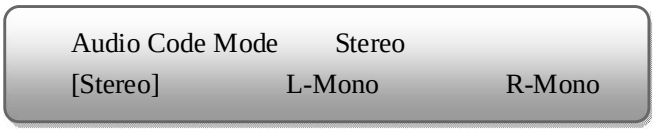
Ø **Sample Rate**

The audio sample rate is 48 KHz without other options.



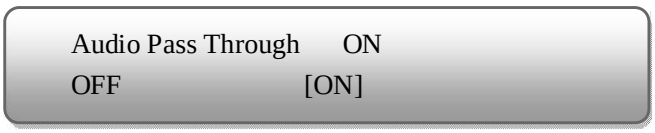
Ø **Code Mode**

Select audio code mode among stereo, L-Mono, and R-Mono.



Ø **Pass Through**

If user needs to pass through AC3 audio, select "*AC3 pass*" as the audio format at menu "*2.1.3 Audio Format*" and select "*ON*" at this menu.

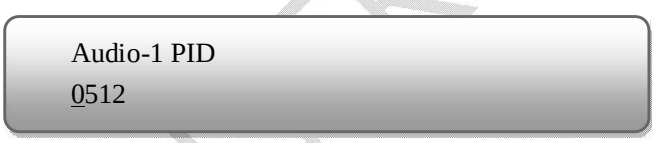


Ø **Audio-1/2 PID**

FUTV4311A HD Encoder supports both **single** audio channel and **dual** audio channels (Audio1 and Audio 2). User can edit the audio PID at menus *2.1.8* and *2.1.9*.

When the audio channel is single, only audio 1 PID is effect, while audio channel is multi, both audio1 and 2 PID are effect.

REMARKS: The value is based on decimal system.

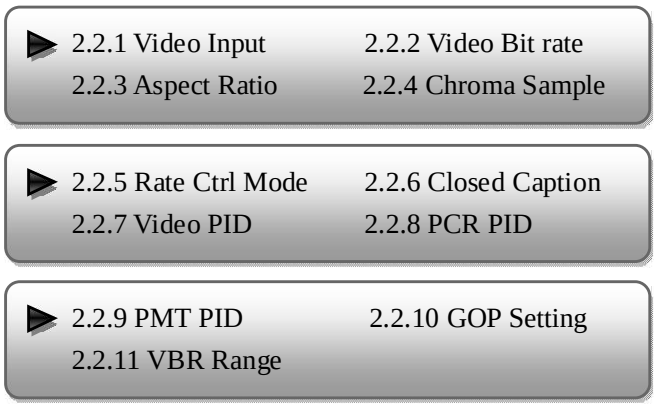


- Press ENTER key to start the editing state;
- Press LEFT/RIGHT key to move the underline;
- Press UP/DOWN key to adjust the value with underline;
- Press ENTER key again to confirm

NOTE

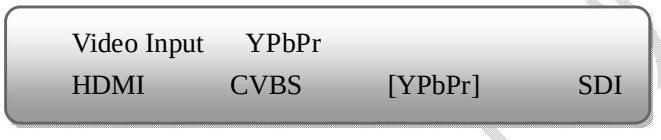
THE OPERATIONAL APPROACHES DEFINED ABOVE ARE APPLICABLE FOR ALL THE OTHER SETTINGS.

3.3.2.2 Video Setting



Ø **Video Input**

Press ENTER to enter menu *2.2.1Audio Input*. It displays the current mode of audio input. Press ENTER again to enter the setting interface, move the square bracket with LEFT/RIGHT keys to select the target mode and press ENTER to confirm. At last, press MENU to step back to the upper menus.



There are 4 types of interface for video input. Select one type and the system will detect the single and process. Make sure the single cables are properly connected.

Ø **Video Bit Rate**

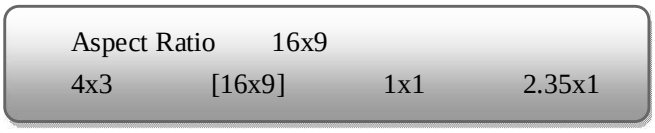
FUTV4311A can encode video at range of 0.25 Mbps to 60.50 Mbps (This item is for setting CBR).

REMARKS:

If **VBR** (Variable Bit Rate) is set as the rate-control mode, make sure the video bit rate is within the VBR range (see 2.2.10).

Ø **Aspect Ratio**

Select one aspect ratio mode from options listed.

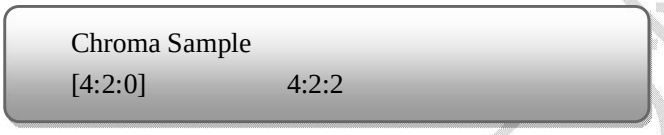


REMARKS:

FUTV4311A supports two Encode Types: **H.264** (MPEG4 AVC/H.264) and **MPEG2** (see 2.3.2). Mode "*2.35x1*" is only applicable for **H.264** encode type.

Ø **Chroma Sample**

Select one Chroma Sample mode from the 2 options listed.

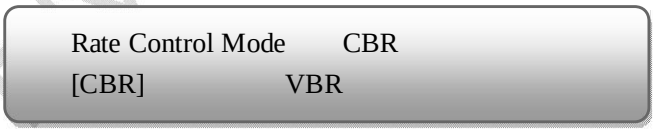


REMARKS:

FUTV4311A supports two Encode Types: **H.264** (MPEG4 AVC/H.264) and **MPEG2** (see 2.3.2). Modes "*4:2:0*" is only applicable for **H.264** encode type.

Ø **Rate Control Mode**

FUTV4311A supports both CBR (Constant Bit Rate) and VBR (Variable Bit Rate) control mode.



Ø **Closed Caption (CC)**

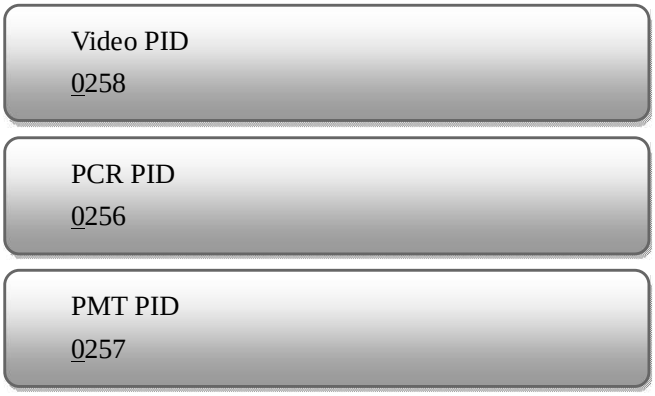
ON: to insert the CC into the output stream

OFF: not to insert the CC into the output stream

Ø **Video/PCR/PMT PID**

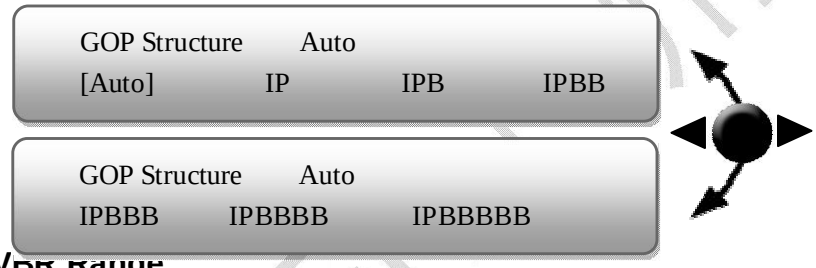
Enter each menu to edit the PIDs.

REMARKS: These values are based on decimal system.



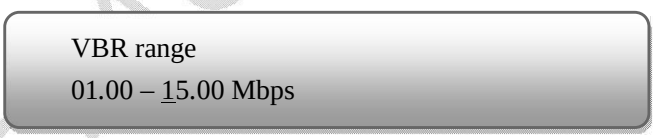
Ø **GOP Setting**

Select GOP structure mode from the options listed.

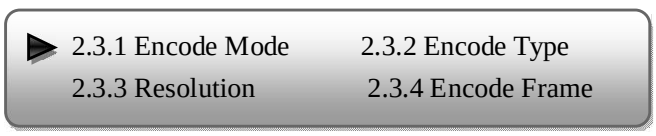


Ø **VBR Range**

When the Rate Control Mode is set as VBR, user can enter this menu to set the VBR range. (The minimum rate is fixed to 1.00 Mbps. User can only set the maximum value.)



3.3.2.3 Encode Setting



Ø **Encode Mode**

User can choose to encode the program automatically or manually at this menu.

```
Encode Mode      Manual
Auto               [Manual]
```

Ø **Encode Type**

FUTV4311A supports two Encode Types: **H.264** (MPEG4 AVC/H.264) and **MPEG2**. User can choose to one mode as the video compression type at this menu.

```
Encode Type      MPEG 2
H.264              [MPEG 2]
```

Ø **Resolution**

Enter this menu to set the video resolution.

```
Encode Resolution      576i
480i        [576i]        720p        1080i
```

Ø **Encode Frame**

Enter this menu to set the video frame.

```
Encode Frame      50
[50]              59.94             60
```

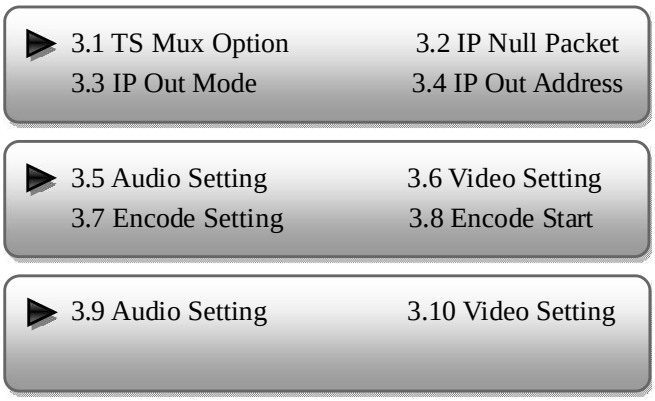
3.3.2.4 Encode Start

After finishing all the configuration of V/A and encode modes (from 2.1-2.3), user can choose "*Yes*" in 2.4 to start processing the program.

```
Encode Start?
►No          Yes
```

3.3.3 OUTPUT SETTING

Enter "*3 Output Setting*" to set the output parameters. Submenus go as below:



3.3.3.1 TS Mux Option

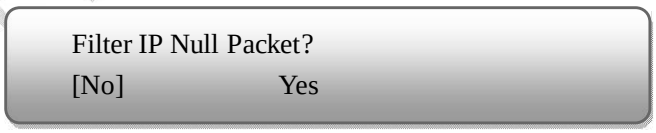
Encode: to pass through the encoded program inputting from HDMI / YPbPr / SDI / CVBS interface. In such case, programs from ASI will not output.

ASI: to pass through the ASI programs. In such case, program from HDMI / YPbPr / SDI /CVBS interface will not output.

Mux: to select programs from both ASI and Encoded to output. User can only complete the multiplexing operation by parsing and filtering programs in Web management interface.

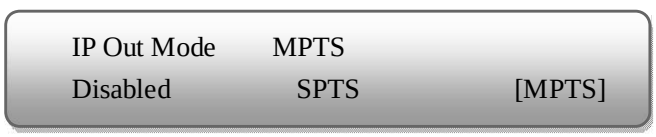
3.3.3.2 IP Null Packet

User can decide whether to filter IP null packet at this menu.



3.3.3.3 IP Out Enable

FUTV4311A HD encoder supports program stream to output over IP (MPTS or SPTS) through the DATA port.



3.3.3.4 – 3.3.3.9

User can enter **3.3.3.4 – 3.3.3.9** respectively to check or modify

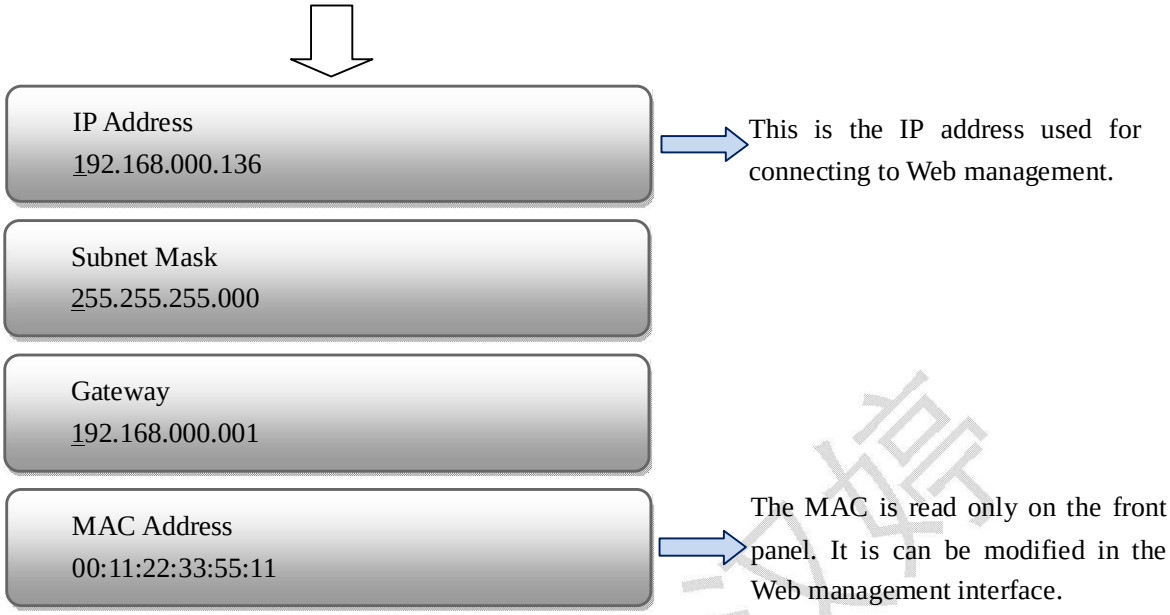
Source MAC is read only on the front panel. It is can only be modified in the Web management interface.

3.3.3.10 Output Bit rate

This bit rate is special for ASI pass-through or multiplexed programs. (If "ASI" or "Mux" is selected in "***3.1 TS Mux Setting***", this bit rate is effective. If "Encode" is selected, the bit rate is set in part 2.2.)

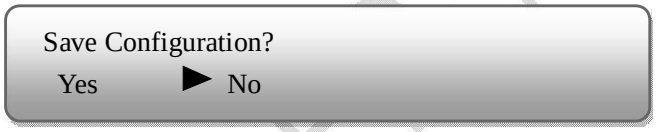
3.3.4 NETWORK SETTING

Enter "*4 Network Setting*" to set the network. Submenus go as below:


IP Address
192.168.000.136
This is the IP address used for connecting to Web management.
Subnet Mask
255.255.255.000
Gateway
192.168.000.001
MAC Address
00:11:22:33:55:11
The MAC is read only on the front panel. It is can be modified in the Web management interface.

3.3.5 SAVE CONFIGURATION

User can enter *Saving Configuration* for saving settings. Choose yes and press ENTER to confirm.



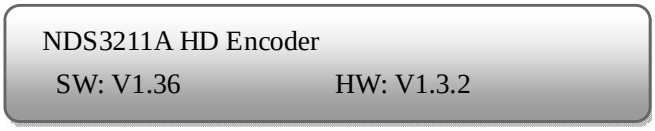
3.3.6 LOAD CONFIGURATION

At this menu, user can select a loading source and press ENTER to confirm. User can restore the device into the last saved configuration by choosing “6.1” and restore the device into factory configuration by choosing “6.2” the display will show as below:

3.3.7 VERSION

User can check the software version and hardware version of this

equipment under this submenu.



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Chapter 4 WEB NMS Operation

User can not only use front panel to set configuration, but also control and set the configuration with a PC (Personal Computer) by connecting the device to web NMS Port. User should ensure that the computer's IP address is different from the FUTV4311A's IP address; otherwise, it would cause IP conflict.

4.1 login

The default IP address of this device is 192.168.0.136. (We can modify the IP through the front panel – menu 4.1.)

Connect the PC and the device with net cable, and use ping command to confirm they are on the same network segment.

I.G. the PC IP address is 192.168.99.252, we then change the device IP to 192.168.99.xxx (xxx can be 0 to 255 except 252 to avoid IP conflict).

Use web browser to connect the device with PC by inputting the device's IP address in the browser's address bar and press Enter.

It will display the Login interface as Figure-1. Input the Username and Password (Both the default Username and Password are "admin".) and then click "LOGIN" to start the device setting.

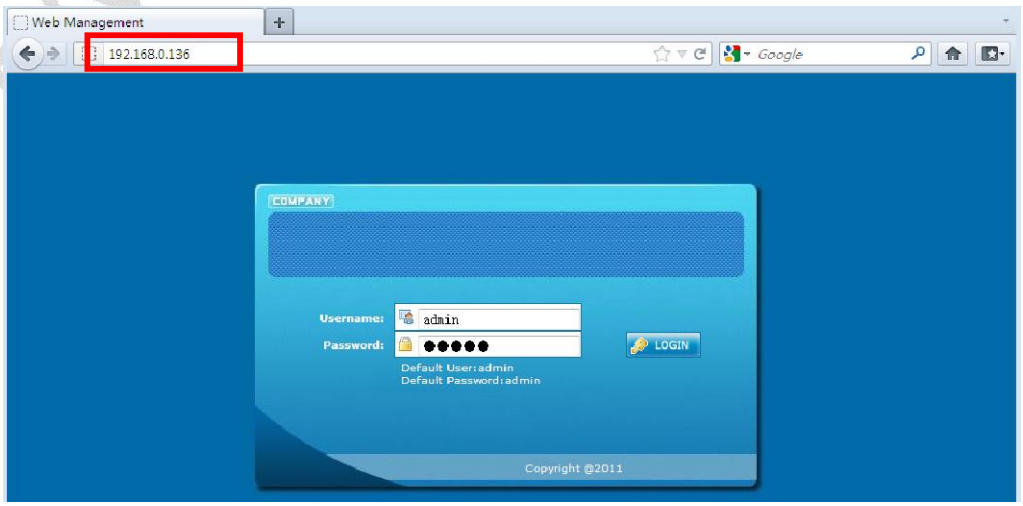
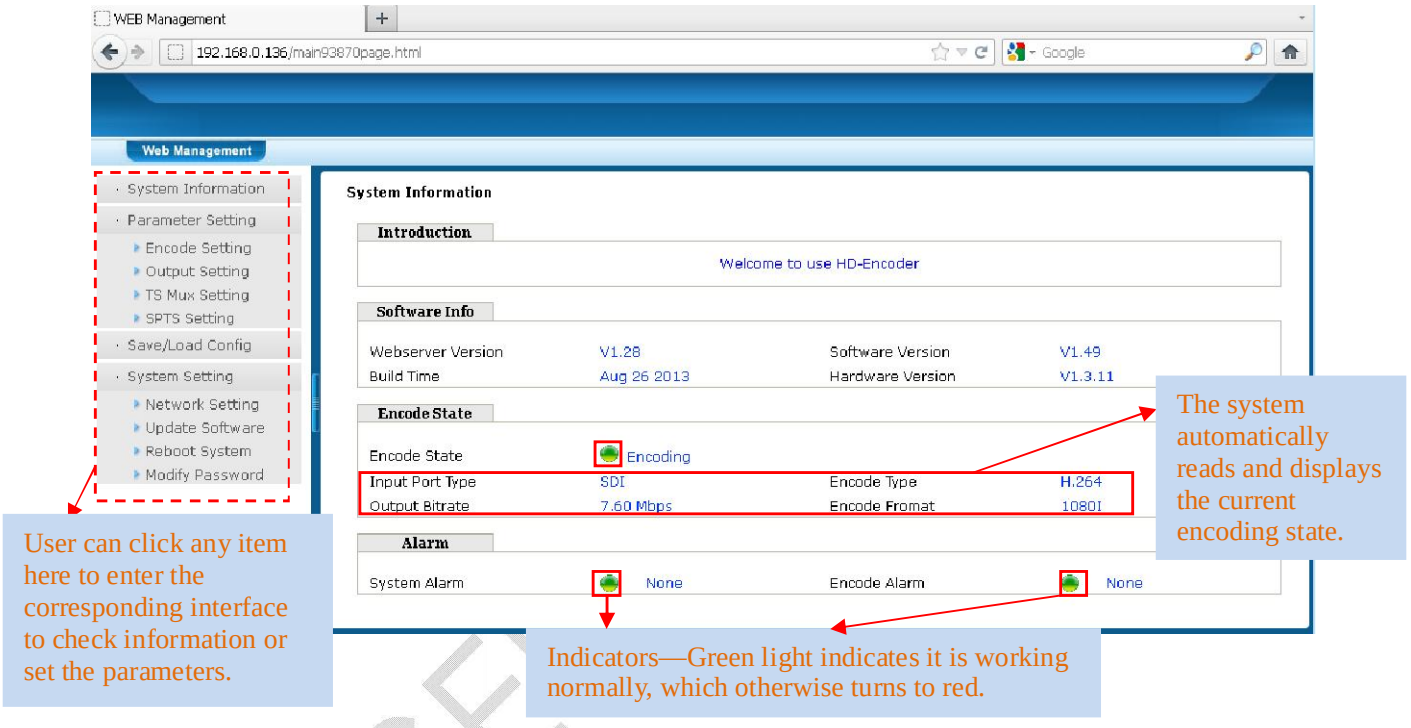


Figure-1

4.2 Operation

Ø System Information

When we confirm the login, it displays the SYSTEM INFORMATION interface as Figure-2 where user can view the system information.



Ø Encode Setting

Click "*Encode Setting*" on the left column and it displays interface as Figure-3 & Figure 4. User can set the Audio/Video parameters by inputting a value or selecting a value in the pull-down list.

NOTE:

In this interface, there are matters needing attentions concerning setting parameters for Audio/Video. As the parameters listed in this interface is the counterpart of items in LCD menu "*2 Encode Setting*", user can refer to the detailed explanations and attentions in "*Chapter 3*" → "*3.3.2 ENCODE SETTING*" in this manual.

Red boxes and arrows in Figure 3 and Figure 4 display the hidden menus under different settings.

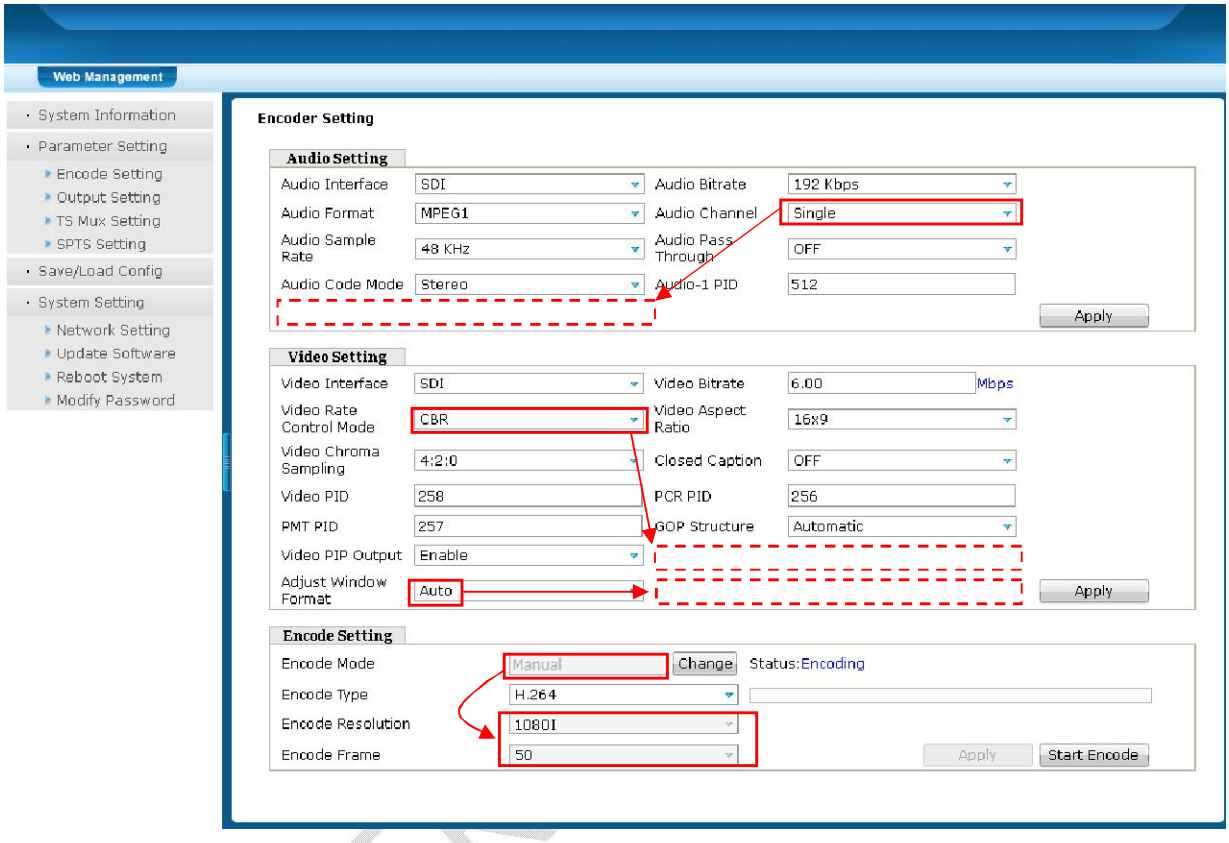


Figure-3

FMUSER

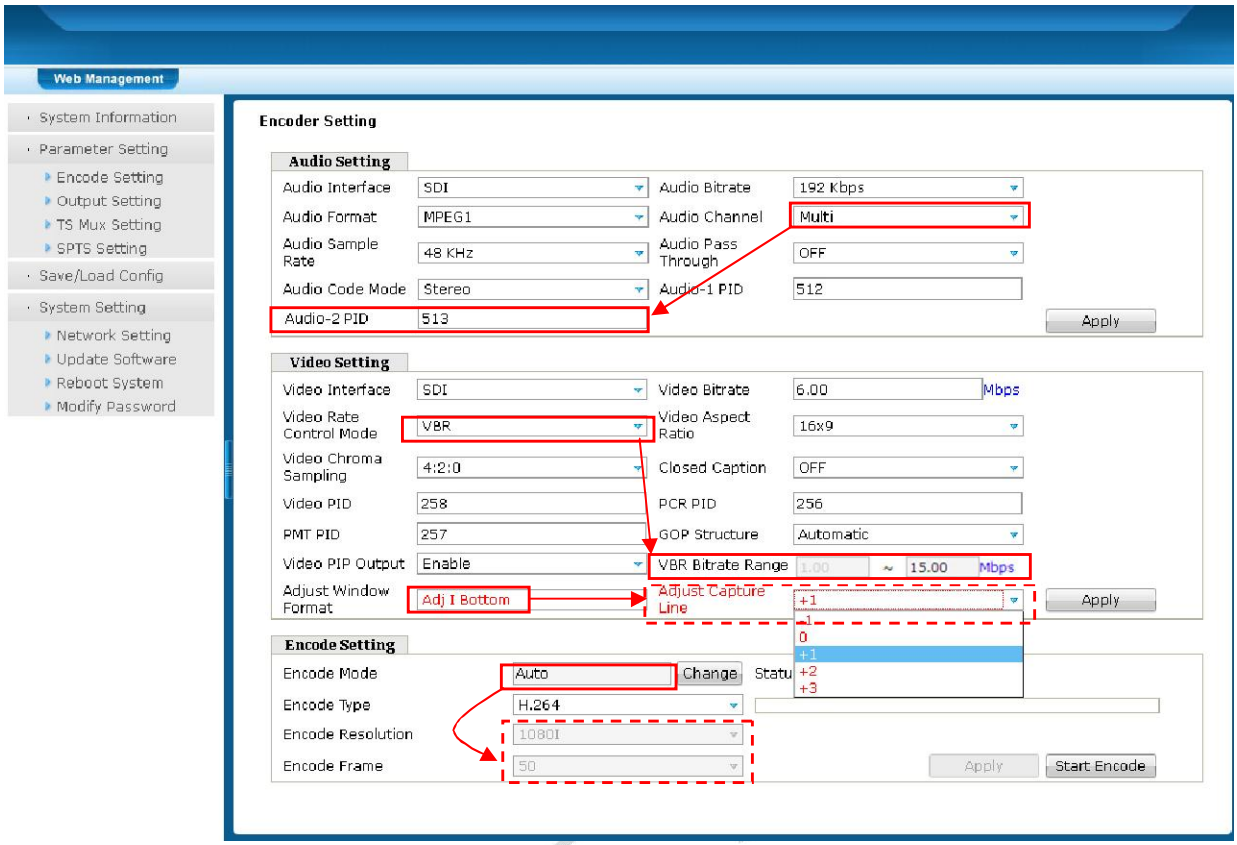
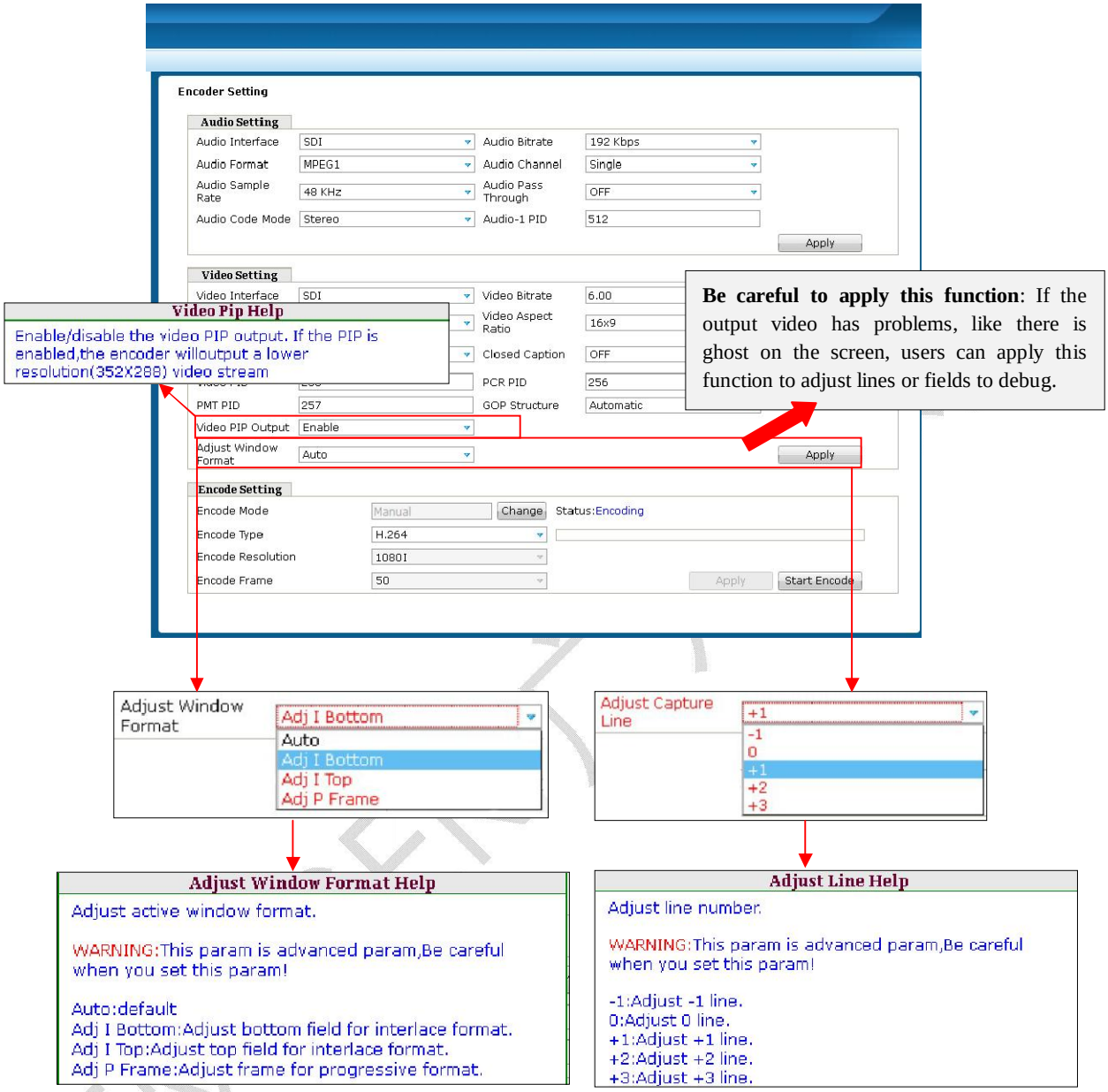


Figure-4

FMUSER

Important Function Remarks:



“Help” Function

In “Encode Setting” Interface, whenever the mouse cursor is suspended on one item, a question mark appears by the cursor and the corresponding item comes to hyperlink state (Figure-5). Click the hyperlink item to trigger a text window to give instructions on properly setting the corresponding item. (Figure-6)

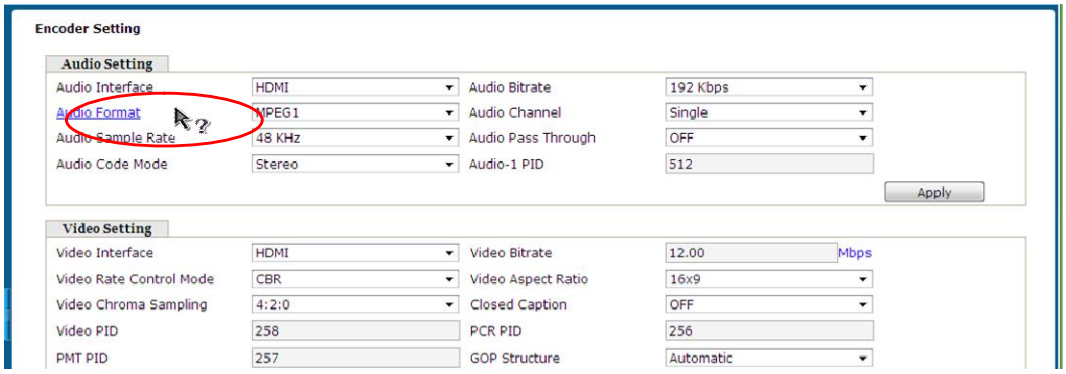


Figure-5

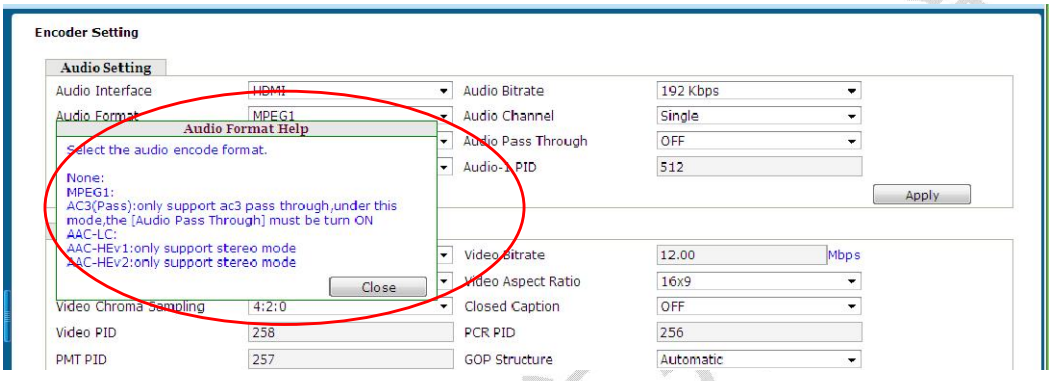


Figure-6

Ø Output Setting

Click *"Output Setting*" on the left column and it displays interface as Figure-7. User can set the output parameters by inputting a value or selecting a mode in the pull-down list.

NOTE:

The parameters displayed in this interface are the counterpart of items in LCD menu "*3 Output Setting*", user can refer to the detailed explanations and attentions in "*Chapter 3*" → "*3.3.3 OUTPUT SETTING*" in this manual.

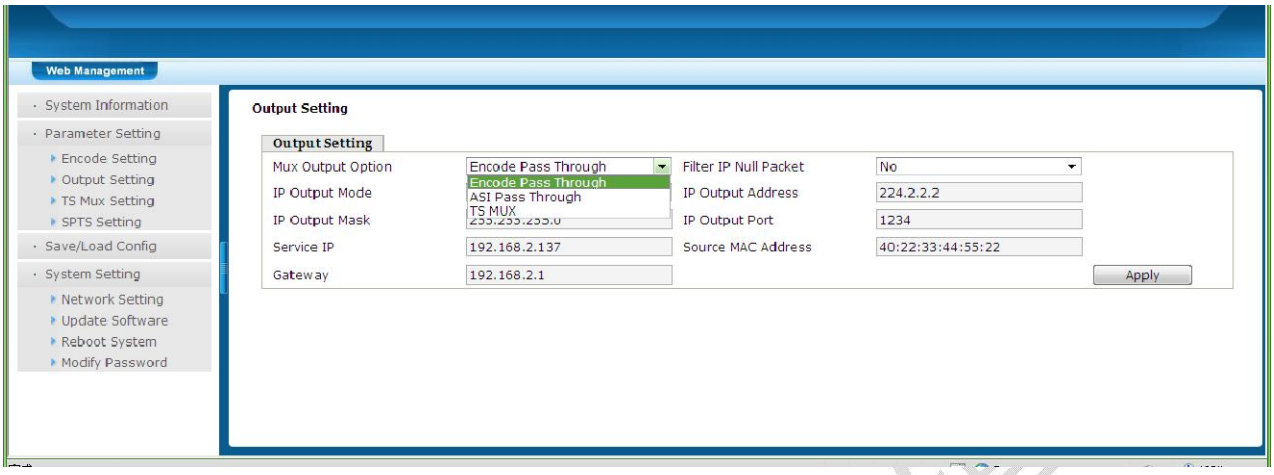


Figure-7

Ø TS Mux Setting

Click "TS Mux *Setting*" on the left column and it displays interface as Figure-8. This section is for filter programs which are from both the ASI IN and Encoder interfaces (HDMI/SDI/CVBS/YPbPr).

NOTE:

This mux section will be applicable on condition that "*TS Mux*" is chosen at the "*Mux Output Option*" in "Output Setting" (Figure 7).

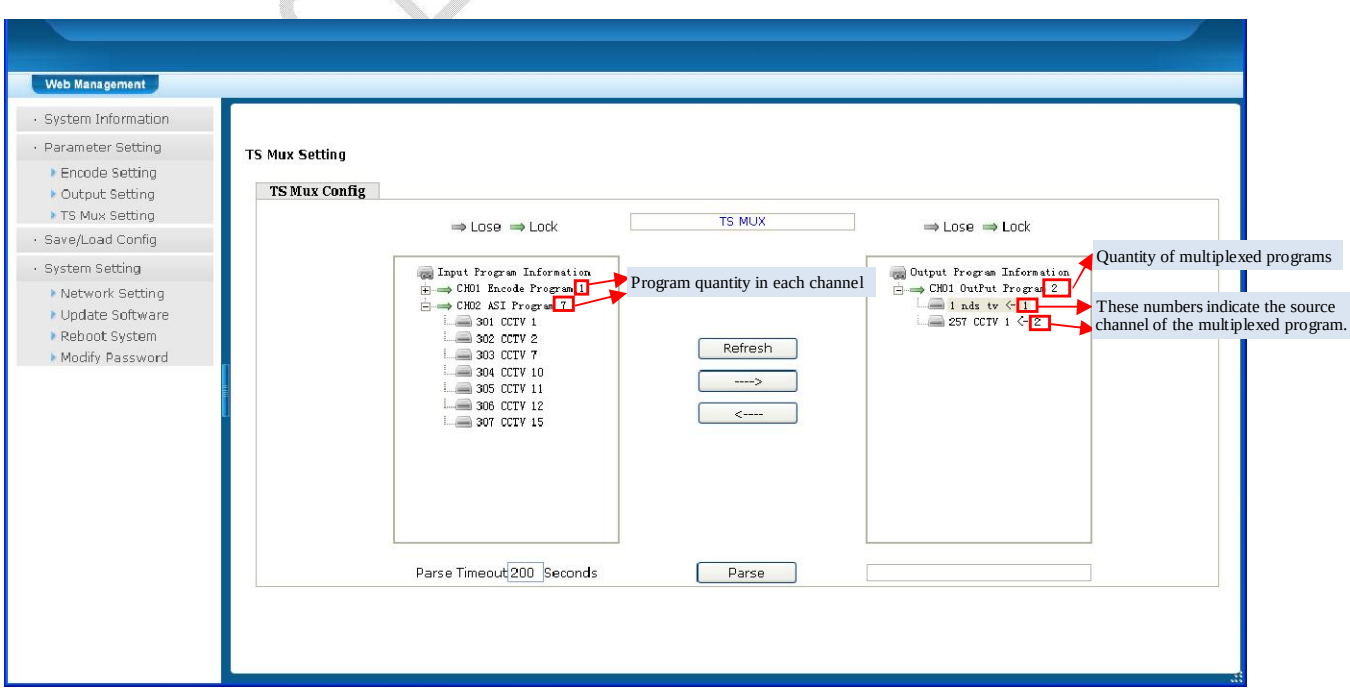


Figure-8

Refresh Click “Refresh” button to refresh the input/output program list.

----> Select one program in the left box and click this button to transfer the selected program to the right box to output.

<---- Similarly, user can click this button to cancel the multiplexed programs from the right box.

Parse click this button to parse the program list in each input channel.

Parse Timeout 200 Seconds: Time limitation to parse the input programs

u **Modify Program Information:**

When one program is selected to output, user can **double-click** the program in the right box to reset the program information. It will trigger a dialog box as below (Figure 9):

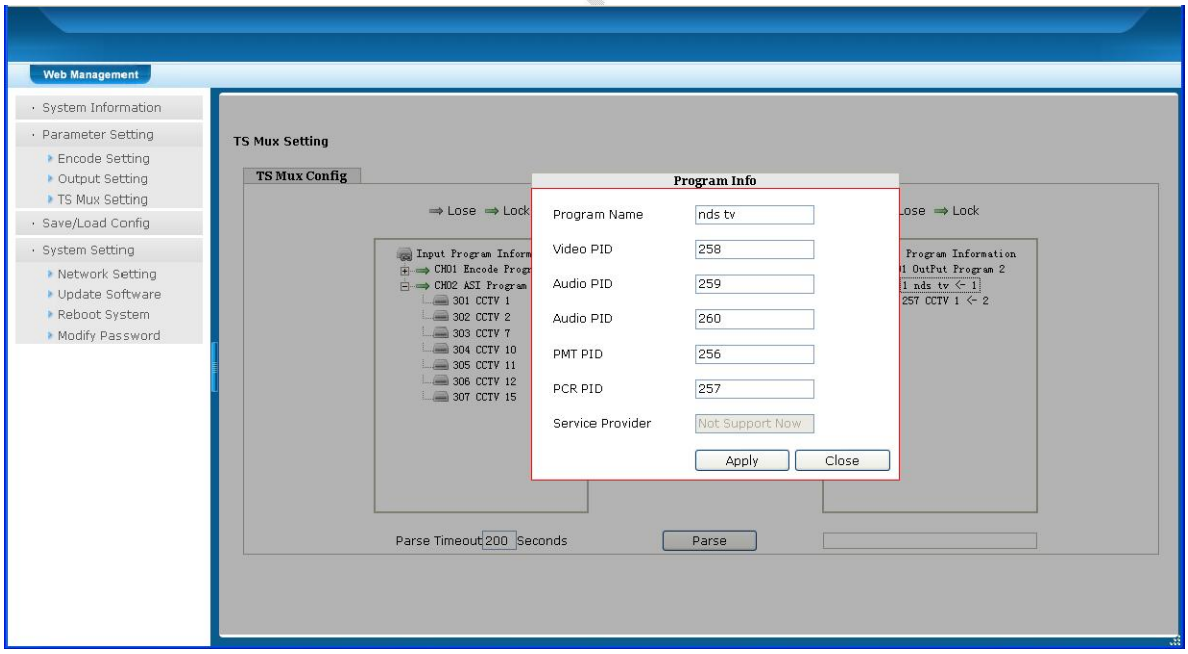


Figure-9

Input the custom data and click Apply to confirm.

Ø **SPTS Setting**

FUTV4311A HD encoder supports 1 MPTS IP or 8 SPTS IP output. Click "*SPTS Setting*" on the left column and it displays interface as Figure-10 where user can configure the SPTS output.

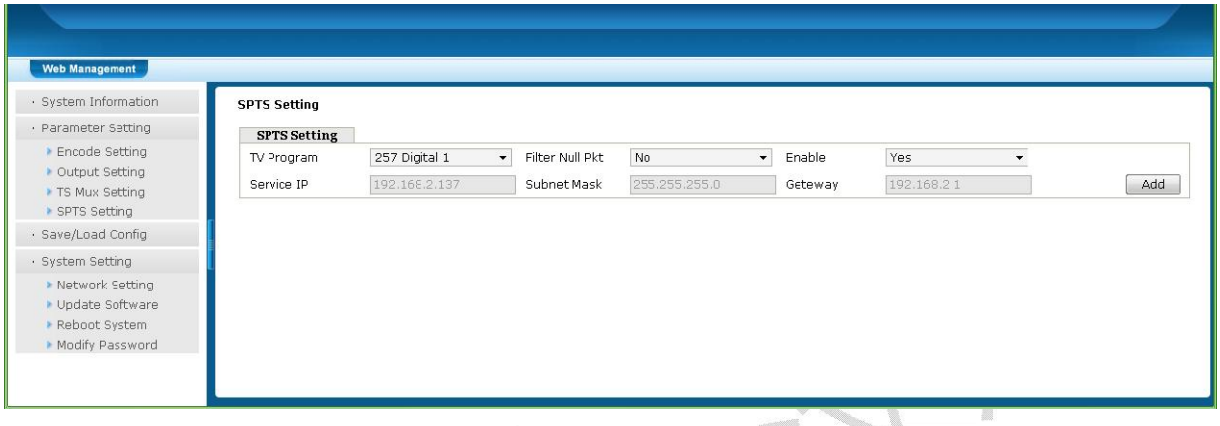


Figure-10

Select one program and click Add to add its SPTS information. (Figure 11)

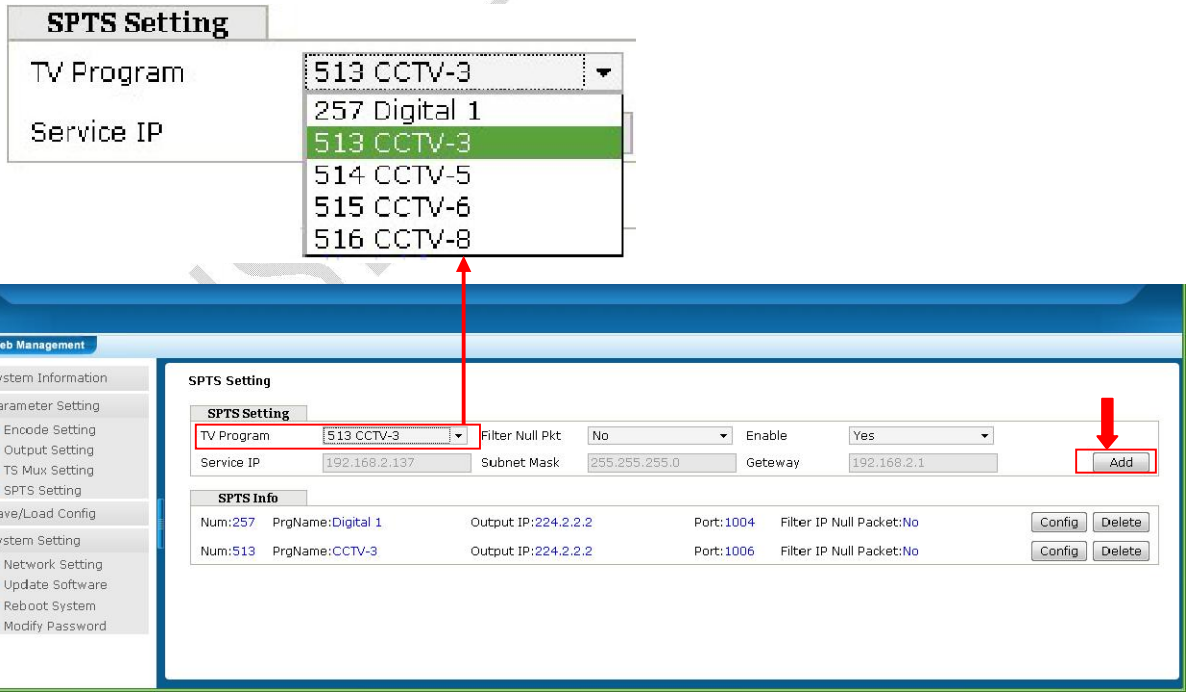


Figure-11

Select one program and click Config to modify its SPTS information. (Figure 12)

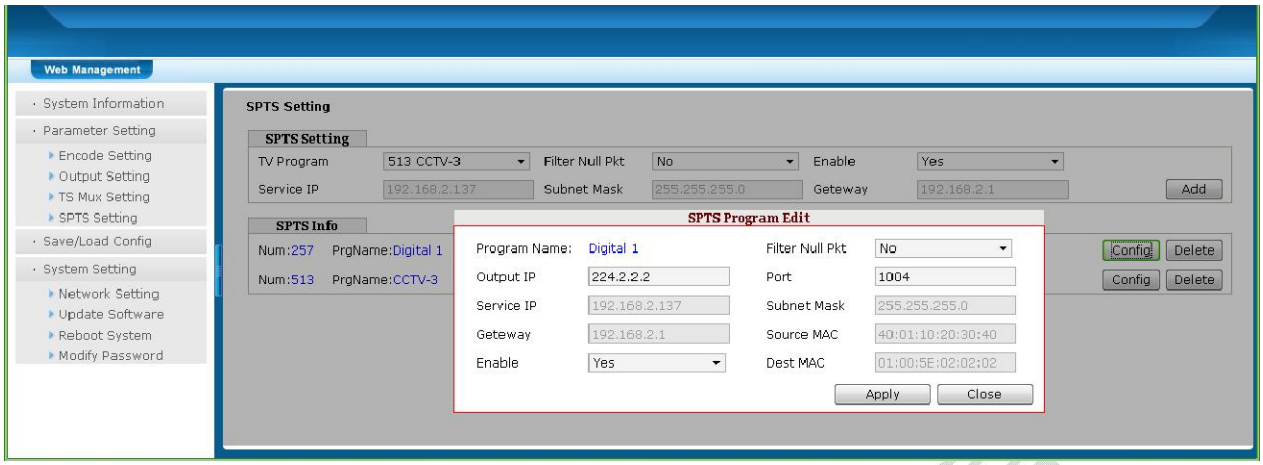


Figure-12

Click Apply to confirm.

Ø Save/Load Config

Click "*Save/Load Config*" on the left column and it displays interface as Figure-13 where user can save new configuration or load existing configuration as per prompts.

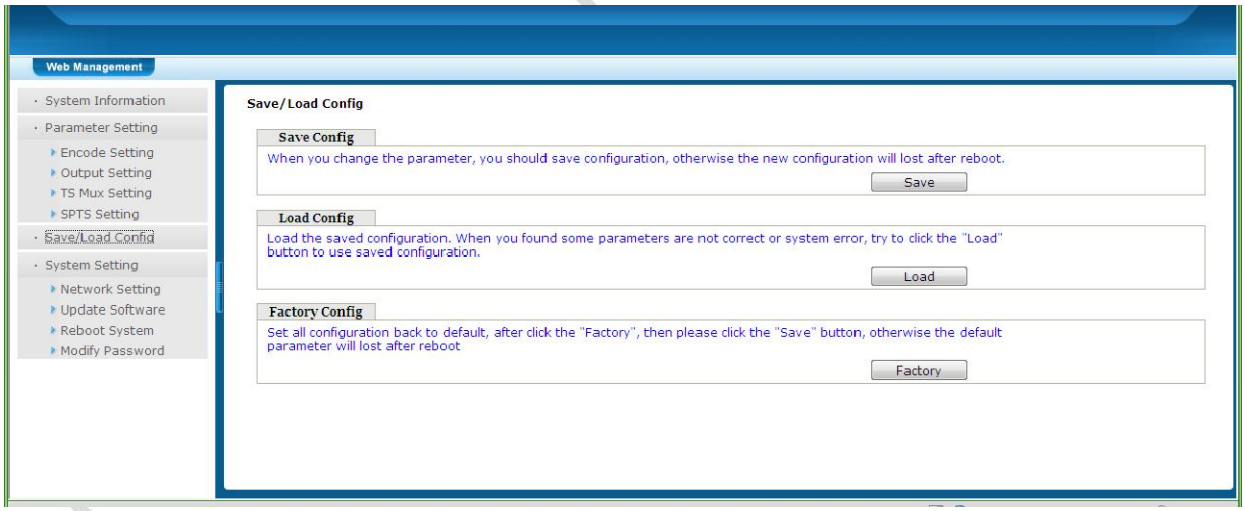

Web Management
System Information
Parameter Setting
Encode Setting
Output Setting
TS Mux Setting
SPTS Setting
Save/Load Config
System Setting
Network Setting
Update Software
Reboot System
Modify Password
Save/Load Config
Save Config
When you change the parameter, you should save configuration, otherwise the new configuration will lost after reboot.
Save
Load Config
Load the saved configuration. When you found some parameters are not correct or system error, try to click the "Load" button to use saved configuration.
Load
Factory Config
Set all configuration back to default, after click the "Factory", then please click the "Save" button, otherwise the default parameter will lost after reboot
Factory

Figure-13

Ø Network Setting

Click "*Network Setting*" on the left column and it displays interface as Figure-14 where user can check or reset the network.

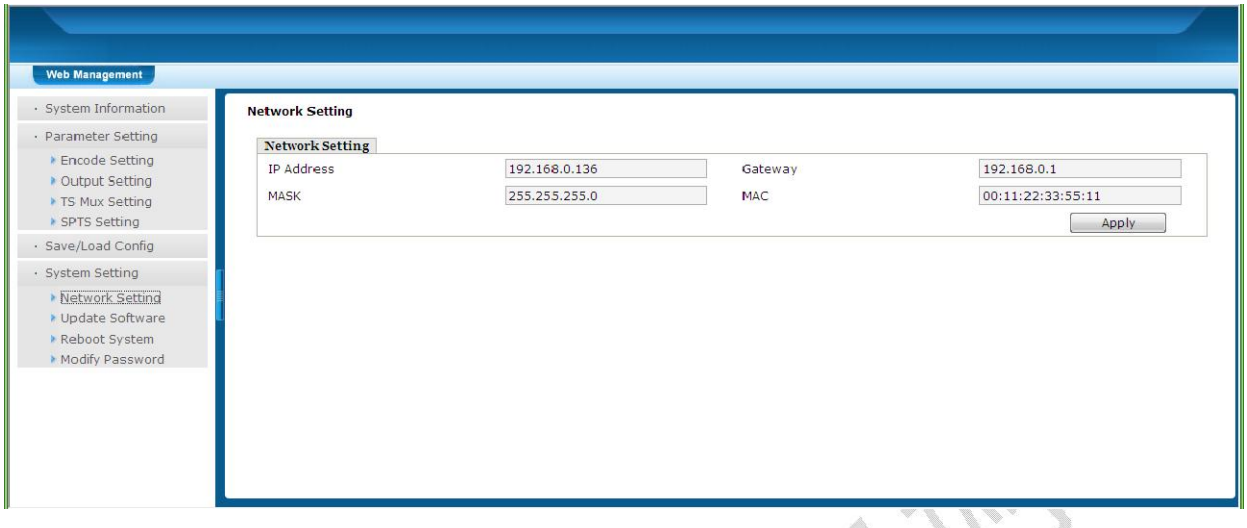


Figure-14

Ø Update Software

Click "*Update Software*" on the left column and it displays interface as Figure-15 where user can update the software for the device. Click browse button to find the update file and click "Update" button to start updating.

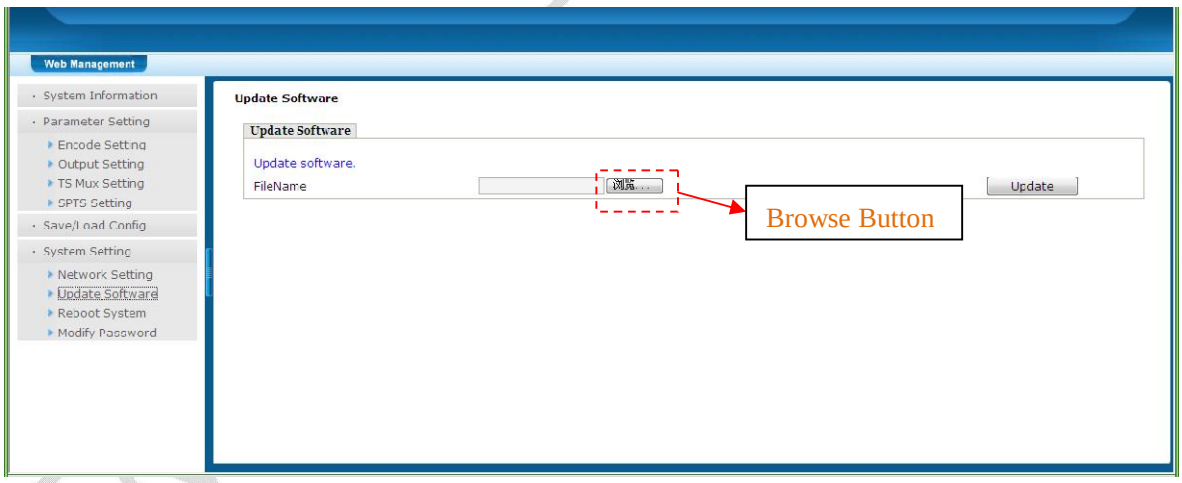


Figure-15

Ø Reboot System

Click "*Reboot System*" on the left column and it displays interface as Figure-16 where user can reboot the system as per prompts.

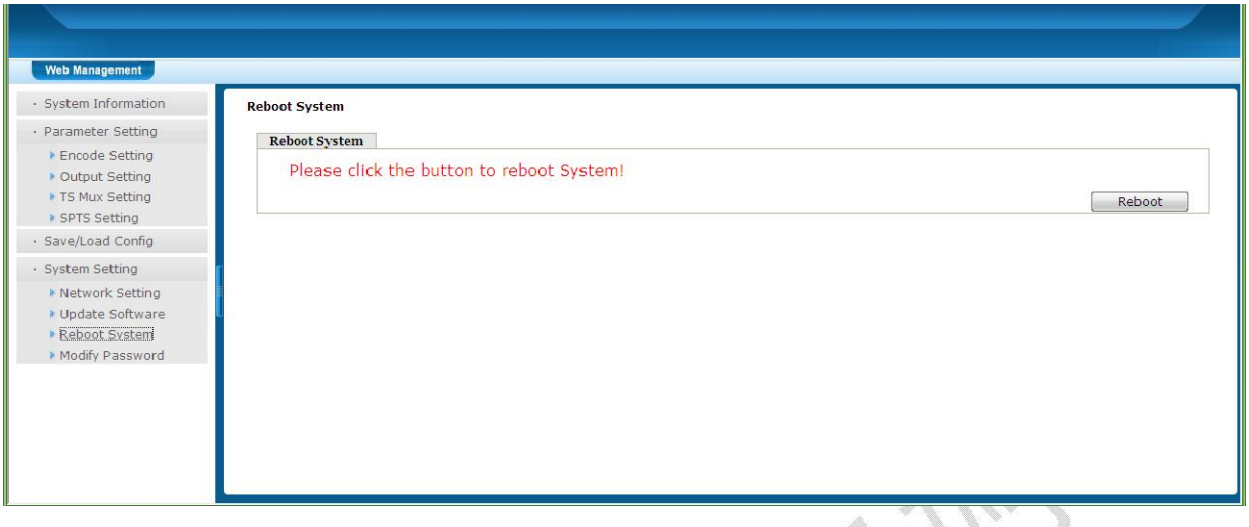


Figure-16

Ø Modify Password

Click "*Modify Password*" on the left column and it displays interface as Figure-12 where user can reset the account information as needed.

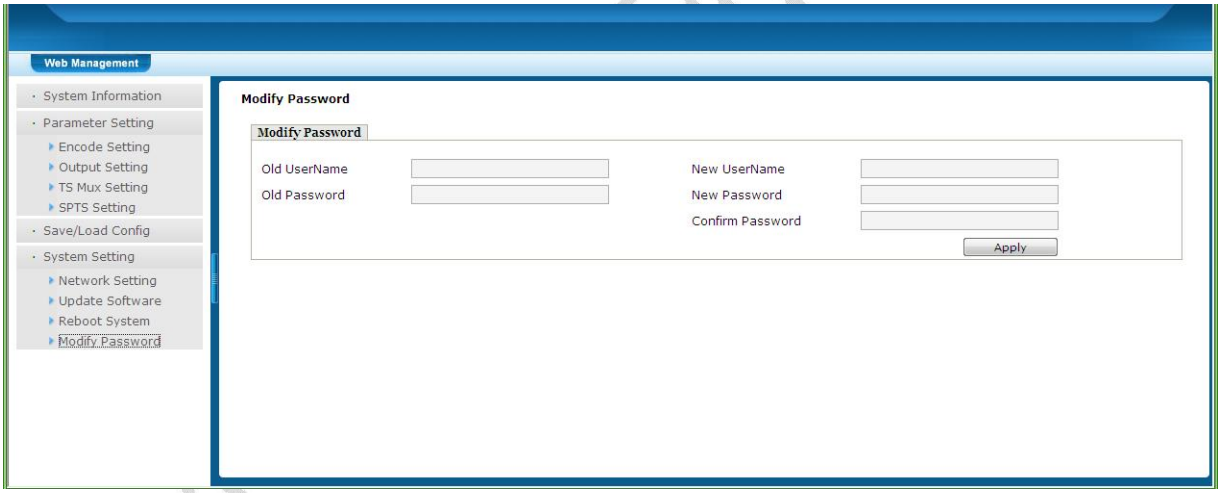


Figure-12

Chapter 5 Troubleshooting

To guarantee the products' quality, reliability and stability, all FMUSER's products have been passed the testing and inspection before ship out factory. The testing and inspection scheme already covers all the Optical, Electronic and Mechanical criteria which have been published by FMUSER. To prevent potential hazard, please strictly follow the operation conditions.

Prevention Measure

Ø Installing the device at the place in which environment temperature between 0 to 45 °C

Ø Making sure good ventilation for the heat-sink on the rear panel and other heat-sink bores if necessary

Ø Checking the input AC within the power supply working range and the connection is correct before switching on device

Ø Checking the RF output level varies within tolerant range if it is necessary

Ø Checking all signal cables have been properly connected

Ø Frequently switching on/off device is prohibited; the interval between every switching on/off must greater than 10 seconds.

Conditions need to unplug power cord

Ø Power cord or socket damaged.

Ø Any liquid flowed into device.

Ø Any stuff causes circuit short

Ø Device in damp environment

Ø Device was suffered from physical damage

Ø Longtime idle.

Ø After switching on and restoring to factory setting, device still cannot work properly.

Ø Maintenance needed

Chapter 6 Packing List

FUTV4311A MPEG2/H.264HD Encoder	1PC
User Manual	1PC
HDMI Cable	1PC
SDI Cable	1PC
YPbPr Cable	1PC
CVBS Cable	1PC
Audio Cables	2PCs
Power Cord	1PC

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